



## COMPATIBILITY FACTORS

California contains an integrated system of military installations, operations areas, ranges, special use airspace (SUA), and military training routes (MTRs). This integrated system of land, air, and sea space is the framework for military readiness activities and provides a key foundation of our nation's security.

Local government planning provides a framework to assist communities with shaping and guiding growth and development. The recognition of both local planning and military readiness needs and objectives is critical in developing a comprehensive, collaborative planning process to address compatibility issues.

To preserve military readiness, it is important to understand the definition of military readiness and the compatibility factors that impact it. This section will help local governments, land owners, agencies, and the military gain a common understanding of these issues. This common understanding is an important first step in developing an ongoing dialogue on compatibility planning.

### 2.1 Military Readiness

California Senate Bill 1468 (codified in Government Code 65302(a)) defines "military readiness activities" as:

- Training, support, and operations that prepare the men and women of the military for combat;
- Operation, maintenance, and security of any military installation; and
- Testing of military equipment, vehicles, weapons, and sensors for proper operation or suitability for combat use.

### Military Areas

People often associate military land uses with the local military base in their region when, in fact, there are many different types of military areas. The various types of military areas are described below.

#### Military Training Areas

Military training areas are portions of land or sea on an installation or range that are used to conduct military exercises and training. Size, use, terrain type, and training restrictions vary for each training area. Boundaries of training areas also vary (within the confines of the installation or range) and are often defined by natural topographic features.

#### Land Space

A military unit's land requirements may include:

- The land on which a military installation or area resides;
- Compatible land uses around military areas used for training and operating areas in order to maintain safety and security;
- Compatible land uses under its MTRs and other critical airspace so that pilots can safely test and train in realistic scenarios; and
- Land to support live-fire training exercises.

#### Airspace – Special Use Airspace

Designated areas of airspace over both land and sea are necessary for military testing and training. Airspace corridors are also needed to provide airspace connectivity to and from military installations, and training and operating areas.

---

## *Compatibility Factors*

---

The Interagency Airspace Coordination Guide (<http://www.fs.fed.us/r6/fire/aviation/airspace/web/guide/>) provides a wealth of information on the definition and use of airspace. According to this guide, six types of SUA have been established by the Federal Aviation Administration (FAA), as described below.

- **Military Operations Area (MOA).** A MOA is airspace established to segregate certain non-hazardous flight activities from Instrument Flight Rules (IFR) traffic and to identify Visual Flight Rules (VFR) traffic. Within these areas, the military conducts flight activities, such as acrobatic or abrupt flight maneuvers, intercepts, air combat maneuvering missions, and aerial refueling. In addition to maintaining military readiness in the air, these areas are used to train student pilots. MOAs are three dimensional areas. In addition to the mapped boundaries, MOAs have a defined floor (minimum altitude) and ceiling (maximum altitude). These altitudes can range from the surface up to the maximum ceiling of 17,999 feet above mean sea level (MSL). On sectional charts, IFR enroute charts, and terminal area charts, MOAs are identified in magenta lettering that states a specific name followed by the letters "MOA".
- **Restricted Areas (RA).** Restricted Areas are an important asset to the DoD because they allow for the use of weapons for training and testing purposes. These areas are necessary for ground weapons and artillery firing, aerial gunnery, live and inert practice bomb drops, and guided missile testing. Restricted Areas provide locations for training and testing to support combat readiness of aviation and ground combat units while separating these activities from the public and general aviation users. These areas are identified by the letter "R" followed by a number on sectional charts, IFR enroute charts, and terminal area charts.
- **Warning Areas (WA).** Warning Areas can exist in domestic and international waters. These airspace areas are similar to a combination of restricted airspace areas and MOAs because the activities that occur can be hazardous, non-hazardous, or both. Within these areas, the military can conduct major exercises using dozens of ships and aircraft performing an array of training and testing activities, such as naval gunfire, aerial gunnery, guided missile exercises, and practice interceptions. These areas are identified by a "W" followed by a number on sectional charts, IFR enroute charts, and terminal area charts.
- **Alert Areas (AA).** High volumes of pilot training or an unusual type of aerial activity (e.g., military, aircraft manufacturers, high concentrations of flights in the area) may occur in AAs. No special requirements are needed for operations in an AA, but all operations taking place in an AA must comply with FAA regulations. These areas are defined by an "A" followed by a number on sectional charts, IFR enroute charts, and terminal area charts.
- **Prohibited Areas (PA).** These areas vary in dimensions and are established over sensitive ground facilities (e.g., the White House, Camp David, presidential homes, etc.). Aircraft wishing to navigate in this airspace must receive approval from the FAA or PA controlling agency. PAs are identified with a "P" followed by a number on sectional charts, IFR enroute charts, and terminal area charts.
- **Controlled Firing Areas (CFA).** These areas contain military or civilian activities that could be hazardous to aircraft not

participating in the activity (e.g., rocket testing, ordnance disposal, small arms fire, chemical disposal, etc.). CFAs use ground lookouts or radar to identify aircraft that might be approaching the area. When this happens, all activities in the CFA are suspended until the area is clear again. Non-participating aircraft are not required to change their flight path with regards to a CFA; therefore, CFAs are not charted by the FAA. CFA information can be obtained by contacting the nearest regional FAA headquarters.

### **Airspace – Military Training Routes (MTRs)**

MTRs are similar to complex systems of interrelated and interdependent highways in the sky that connect military installations, ranges, and operation areas. They are used by the DoD to conduct low-altitude navigation and tactical training at airspeeds in excess of 250 knots and at altitudes as low as just above surface level. These low-level, high-speed routes allow pilots to develop the skills necessary to avoid detection by enemy radar. In California Law (AB 1108, Pavley, Chapter 638, Statutes of 2002), a low-altitude MTR is defined as a route where aircraft operate below 1,500 feet MSL.

### **Sea Space**

Proficiency on the sea allows the military to perform many functions, ranging from peacekeeping and humanitarian operations to wartime operations such as Anti-Air Warfare (AAW), Anti-Submarine Warfare (ASW), Amphibious Warfare (AMW), Maritime Interdiction Operations (MIO), and special operations. Sea space, like land space, requires both test and training areas. Dedicated DoD sea space areas are dependent on waterway channels that provide connectivity between the test and training areas located at sea and the ports.

### **Lines of Communication**

The military uses the phrase “Lines of Communication” to define any means of

communicating (via phone, satellite, etc.) or the transporting of military equipment, materials, or forces (via ground, air, or water) for military operations or training. These communication and transportation corridors are necessary infrastructure for military readiness. Often, the military must share these areas and facilities with the public, such as shared use of a roadway. Increased demand for these shared lines of communications is straining their capacity in some parts of California. A concentrated effort between community and military representatives to share and plan for maintenance, expansion, or the development of alternatives for this infrastructure is critical to sustaining military readiness and community services.

### **Frequency Spectrum**

The military's use of frequency spectrum allows for safe operations and the effective delivery of weapons on target without interference. The military's frequency spectrum needs for testing, evaluation, and training is constantly increasing, while the spectrum available for DoD use is decreasing. The National Telecommunications and Information Administration (NTIA) Office of Spectrum Management explains that:

*“almost every agency of the Federal Government uses the spectrum in performing mandated missions. The DoD uses the spectrum extensively for tactical uses and non-tactical uses. In the United States tactical uses are generally limited to a number of specific testing sites and training facilities, but DOD's non-tactical applications are extensive and include aircraft command and control, mobile communication in and around military bases, and air fields and long distance communications using satellites.”*

### **Challenges to Sustaining Military Readiness**

As development moves closer to military operations and facilities, compatibility issues and competition for limited resources become increasingly important. Residents in affected communities can have concerns about the

impacts of military readiness activities. These concerns include noise, safety, traffic, housing availability, and property values. Whether perceived or real, these concerns can directly or indirectly limit the military's ability to conduct training and testing operations; this, in turn, impacts military readiness.

### **Legislative and Management Issues**

#### **Legislative Initiatives**

An increase in federal, state, or local legislative initiatives directly or indirectly related to the DoD may limit the military's flexibility to conduct the operations, training, or testing needed to sustain military readiness. Even some legislation originally enacted to protect military training ranges has inadvertently restricted the ability to conduct military missions. Legislative initiatives that seek to protect military readiness should be written with room for flexibility to avoid restricting future testing and training on military ranges and areas.

#### **Interagency Coordination**

Each of the military services uses land managed by other state and federal agencies (e.g., U.S. Forest Service [USFS], Bureau of Land Management [BLM], Bureau of Reclamation [BOR], National Park Service [NPS], U.S. Fish and Wildlife Service [USFWS], and state equivalents). The types of allowable uses and restrictions on these lands are often the result of negotiations between the party managing the land and the military.

Land used by the military is normally subject to other federal policies and regulations, such as the Endangered Species Act (ESA). These restrictions can further limit the land available for military training and operations.

---

## **2.2 Compatibility Factors**

---

Compatibility, in relationship to military readiness, can be defined as the balance and/or compromise between community needs and

interests and military needs and interests. The goal of compatibility planning is to promote an environment where both entities can coexist successfully.

There are many factors that influence whether community and military plans, programs, and activities are compatible or in conflict. In this Handbook, these factors have been divided into two types: compatibility factors and competitive factors.

Compatibility factors relate to the ability of specific land uses or activities to coexist. These can cover man-made issues such as noise, light and glare, and dust, or natural resource issues such as sensitive habitats. Competitive factors relate to finite resources that are in high demand so there is competition for their allocation and use.

Military sustainment, protection of public health and safety, and economic viability are just a few of the benefits associated with good compatibility planning. When reviewing development proposals or related applications, local governments can use this list of compatibility and competitive factors as a checklist for evaluating compatibility of the proposed use with military readiness.

*It is important to understand that compatibility/competitive factors are not one-sided.* Just as the military states that placement of incompatible community land uses near military areas can threaten mission capabilities and military readiness, neighboring communities also state that military activities can threaten the community's quality of life and negatively impact property values.

### **Man-Made Compatibility Factors**

Most compatibility factors are man-made. These factors can be generated by a community and conflicting with military activities or they can be factors that are generated by the military and encroaching on nearby communities. Either way, these factors can impact military readiness or a community's viability and quality of life.

### **Compatible Land Use**

Incompatible land uses around military installations and operations may have an impact on the military's ability to conduct its mission and sustain military readiness. Local jurisdictions' general plan and zoning ordinances can be the most effective tools in resolving issues of land use compatibility.

Community land use planning issues around military installations are similar to those around other types of land use operations. Local jurisdictions already consider incompatibility when placing residential developments near commercial or industrial areas. Military installations also have unique functions for consideration by those making community land development and zoning decisions. The DoD has compatible land use standards for airfields relative to noise and safety issues. Samples of how these standards are used by the Air Force and Navy are provided in Appendix D). Some local governments have taken these guidelines and tailored them to their needs, making them more restrictive in some cases (see Appendix D for an example from the State of Arizona).

The location of proposed schools (grades K-12) is frequently noted as a compatibility factor around many military areas. School facilities are governed by school districts and not by the community. Criteria for siting new schools is reviewed by the state, and proposed sites obtain facility siting approval from the Office of the State Architect.

In many cases, military representatives are not aware of new schools until they are built. If a school site is incompatible with military operations, mitigation of the problem after the fact can be very expensive and may force changes in military operations.

### **Safety Zones**

Safety is also a factor that affects land use compatibility. There are several different categories or zones of safety that require some type of compatible land use restrictions. Some

examples of these safety categories or zones include: Accident Potential Zones (APZ), Clear Zones (CZ), and Explosive Safety Quantity Distance Arcs (ESQD). The types of compatible land uses within safety zones are limited. The military compatible land use standards discussed above, and provided in Appendix D, give guidance on compatible land uses relative to APZs and CZs, but do not cover ESQD.

### **Vertical Obstructions (Height of Structures)**

The height of buildings and other structures may encroach into the navigable airspace used by military operations (aircraft approach, transitional, inner horizontal, outer horizontal and conical areas, as well as MTRs), presenting a safety hazard to both the public and military personnel and potentially impacting military readiness.

### **Local Housing Availability**

Given personal choice to live off-base and funding realities, the military only provides on-base housing to a portion of the military personnel assigned to an installation. The remaining housing demand relies on adjacent communities to meet the needs of military personnel. Given the high cost of housing in California, and limited housing supplies in some areas, it may be difficult for military personnel to find affordable housing in neighboring communities. Also, changes in personnel assigned to an installation can impact local supplies. For instance, a large reduction may reduce prices in the market related to lower demand. The opposite occurs when increases result in short- to long-term shortages.

### **Infrastructure Extensions**

Infrastructure plays an interesting role in compatibility. In many areas, the DoD is looking at the viability of obtaining infrastructure services from off-installation providers. For instance, an installation may look at connecting to a community's water system instead of operating an independent system of wells, storage, and treatment facilities on the installation. For this to



---

## *Compatibility Factors*

---

work, the installation needs to work with communities, service districts, and other utility providers to ensure that adequate plans are in place to service future demand.

Another example of coordinated planning relates to roadway systems. The military and local governments can work together to plan for adequate capacity and to deal with issues such as delays at installation entrance gates.

The extension or expansion of infrastructure to the installation, or to areas near an installation, also raises the issue of growth inducement. If infrastructure is extended toward military areas, growth may be directed to these areas, causing a potential conflict with sustaining military readiness.

### **Anti-Terrorism Force Protection Requirements (ATEP)**

Since September 11, 2001, military installations and areas have been required to meet new restrictive standards for anti-terrorism force protection. Among these new standards are new entry gate design criteria for all military installations. These new design standards have created long queues that can impact local roadways and circulation adjacent to some installations. Coordination between the local community and the military installation is necessary to work proactively to devise a solution for these situations.

### **Noise**

The central issue of noise is the impact, or perceived impact, on people, animals (wild and domestic), structures, and land use. Exterior noise can have a significant impact on human activity, health, and safety. The magnitude of the noise problem, resulting complaints, pressure to modify or suspend operations, and threats of litigation are directly related to the degree to which there are people, wildlife, and noise-sensitive land uses in the vicinity of military installations, ranges, and other military areas.

### **Vibration**

Vibration generated from military aircraft and ground training exercises impacts buildings and other structures within adjacent communities. In some cases, vibration impacts from these exercises can occur in areas where a military presence may not be visible, such as under MTRs.

### **Dust**

Ground and range activities can produce dust from vehicle movement and weapons training. From a community side, dust created by grading activities, agriculture, and air emissions can reduce visibility, impacting military operations.

### **Light and Glare**

Light sources from commercial, industrial, and residential uses at night can cause excessive glare and illumination, which impacts the use of military night vision devices and air operations. Voluntary restrictions on military training at night may foster better community relations, but they pose especially critical limits on essential military testing and training. Conversely, high intensity light sources generated from a military area (such as ramp lighting) may have a negative impact on the adjacent community.

### **Alternative Energy Development**

With natural resources becoming increasingly scarce, there is an increased need to develop alternative energy sources to meet energy needs today and in the future. Often, the location of alternative energy sources is under MTRs, SUA, or close to other military operating areas, thus impacting military readiness. Examples of conflicting energy uses include wind energy farms consisting of tall wind turbines that can obstruct the military airspace or offshore energy platforms that can impact military testing and training on off-shore ranges and operating areas.

### **Air Quality**

As a federal agency, the military is required to conform to the Clean Air Act (CAA), which is governed in California by the California Air

Resources Board. Air quality permits are issued at a regional level by the Regional Air Quality Control Boards. Air quality issues, such as dust and exhaust generated from testing and training operations, can impact adjacent communities. When these air impacts are generated by operational, training, and testing missions in non-attainment areas, conformance with individual State Implementation Plans (SIPs) can restrict existing mission requirements or preclude the execution of new missions or the deployment and use of new weapon platforms.

### **Frequency Spectrum Impedance and Interference**

In carrying out readiness activities, the military relies on a range of frequencies for communications and support systems. Public uses also rely on a range of frequencies to support daily life. As the use of the frequency spectrum increases (such as the rapid increase in cellular phone technology over the last decade) and as development expands near military installations and operations, the issue of frequency spectrum impedance, interference, and competition increases. Issues related to frequency spectrum competition are covered in the "Competitive Factors" section.

Key issues to consider relative to frequency spectrum impedance include the construction of buildings or other facilities that block or impede the transmission of signals from antennas, satellite dishes, or other transmission/reception devices affected by line-of-sight requirements. Some transmission/reception devices have what are called "look angles." Look angles relate to a transmission or reception source that is targeted to another device in a specific direction and angle (both horizontal and vertical). For some systems, this look angle is fixed (like a microwave relay tower), for others, such as a satellite tracking facility, the look angles will change over time.

Frequency interference is related to other transmission sources. Interference can result from a number of factors, including: new transmissions using a frequency that is near an

existing frequency, moving an antennae transmitting on a similar frequency to a closer location, increasing the power of a similar transmission signal, use of poorly adjusted transmission devices that transmit outside their assigned frequency, or production of an electromagnetic signal that interferes with a signal transmission.

When reviewing new facilities or transmission sources near a military installation, facility, or operations areas, military and local government planners should consult in order to reduce conflicts.

### **Public Trespassing**

Military areas that are located on other federal lands or are adjacent to federal lands designated for public recreation often experience issues related to public trespassing into training ranges and other areas with safety hazards related to military operations. When trespassing occurs within these areas, military training and operations can be suspended from a few hours to several days.

### **Cultural Sites**

Cultural sites that are located on military training areas can include sites sacred to Native Americans. Operations and training activities are not allowed on these sites. This has an impact on the military mission and training capacity.

## **Natural Compatibility Factors**

In addition to man-made compatibility factors, natural compatibility factors also are potential sources of conflict with military readiness activities. Natural factors impacting compatibility are described below.

### **Water Quality**

Discharge permit requirements and prohibited or restricted access to wetlands or their buffer zones can restrict existing mission training, preclude or restrict the integration of new technology and weapons systems into existing missions and training, or prevent the future growth and

---

## *Compatibility Factors*

---

execution of new missions in amphibious, riverine, estuarine, and other salt and fresh water areas.

### **Threatened and Endangered Species**

When development occurs on private land, natural areas that once provided valuable habitat can be diminished or lost. This can result in relatively natural areas within and under training or operational areas to become refuges to wildlife and native vegetation. The diminishing quantity and quality of habitat in a developing area increases the value of the habitat on the military lands. As development continues, regulations designed to protect threatened or endangered species can reduce the military value of an installation, range, or special use airspace by limiting the types of permissible activities in terms of composition, magnitude, or timing. Compatibility planning needs to address species protection from both a military and private development perspective to ensure the burden of protection is evenly distributed.

### **Marine Environments**

Regulatory or permit requirements protecting marine and ocean resources can cumulatively affect the military's ability to conduct operations, training exercises, or testing in the marine environment.

## **Competitive Factors**

Competition for finite resources can cause compatibility issues between local governments, the federal government, other agencies, and the military. The following is a description of some of the key finite resources that are in high demand.

### **Competition for Scarce Natural Resources**

Pressures to gain access to valuable natural resources (such as oil, gas, minerals, water, and shoreline areas) located on military installations, within military training areas, or on public lands historically used for military testing and training can affect the ability to use this land or water for operational training or test objectives.

### **Competition for Land Space, Airspace, and Sea Space**

The military manages or uses land, air, and sea space to accomplish testing, training, and operational missions. These resources (land, air, and sea space) must be available and of a sufficient size, cohesiveness, and quality to accommodate effective training and testing. The demands of extended operational reach, both in terms of breadth and depth, make the military installation, training area, airspace, and sea space of the region, and interconnected collaboration between the military training and test installations, more important as requirements and capabilities of weapons and command and control systems continue to improve.

The land, air, and sea spaces used by the military can be owned by the DoD, designated for DoD use by a federal or state agency, provided through easements or other agreements with public or private entities, or maintained as a historic usage right. Public and private requests to share or take over some of these resources may have a negative impact on military training and test objectives.

### **Competition for Frequency Spectrum Capacity**

The competition for available frequency bandwidth reduces available frequency spectrum capacity for training and developmental/operational testing activities. The lack of spectrum capacity decreases the effectiveness of exercises by restricting the number or types of weapons that can participate. In addition, spectrum limitations may restrict the use of state-of-the-art instrumentation systems, resulting in less data for evaluators to use in training assessments. Limitations also may restrict the development testing of new technologies. As the potential for residential and commercial encroachment increases, so does the risk of increased Radio Frequency (RF) emitters and receivers that create electromagnetic interference (EMI) problems between military systems and public or commercial systems. For example, some low power consumer devices, such as



remote controls, cordless phones, garage door openers, and baby monitors, utilize frequencies assigned to the military. These low power, short range systems operate under rules set out in Part 15 of the Federal Communications Commission (FCC). Given their low power output, these are not supposed to impact, or be impacted by, other devices in the assigned frequency ranges. But, as military and community uses have come in closer proximity, conflicts sometimes occur.

#### **Competition for Ground Transportation Capacity**

With the expansion of urban development into rural areas, rural county roads are becoming major arterial roadways. These once rural roads are the main transportation corridors for transporting military equipment, munitions, material, and forces to conduct military operations and training. As traffic loads increase on these roadways, military convoys and certain load types become increasingly difficult to mix into the urbanized traffic flow.

---

## *Compatibility Factors*

---

*Please see the next page.*